R. PINKETT.

AUTOMATIC DRILL.

APPLICATION FILED DEC. 6, 1910.

1,041,343.

Patented Oct. 15, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

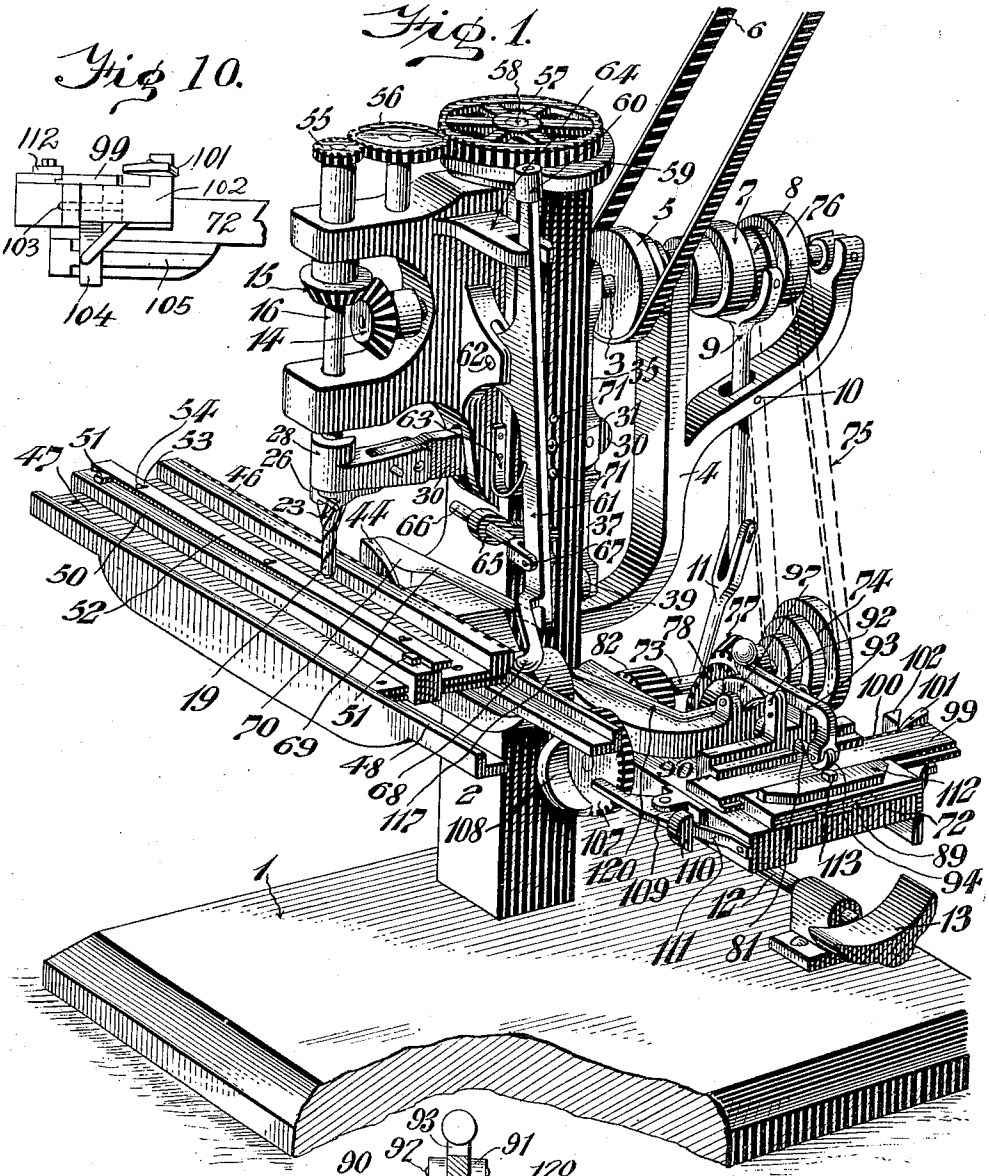
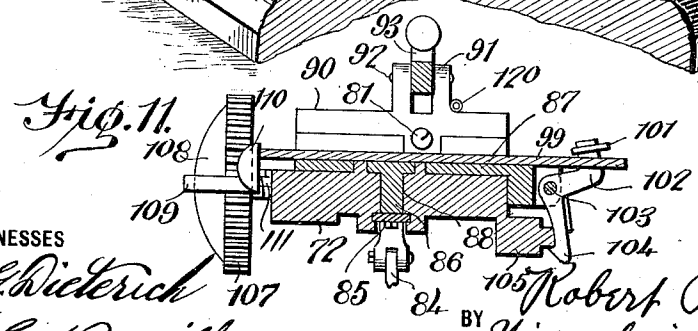


Fig. 10.

Fig. 11.



WITNESSES

H. G. Dieterich

L. Douville.

INVENTOR

Robert Pinkett.

BY Niederheim & Fairbanks.

ATTORNEYS

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3 SHEETS—SHEET 2.

Fig. 2.

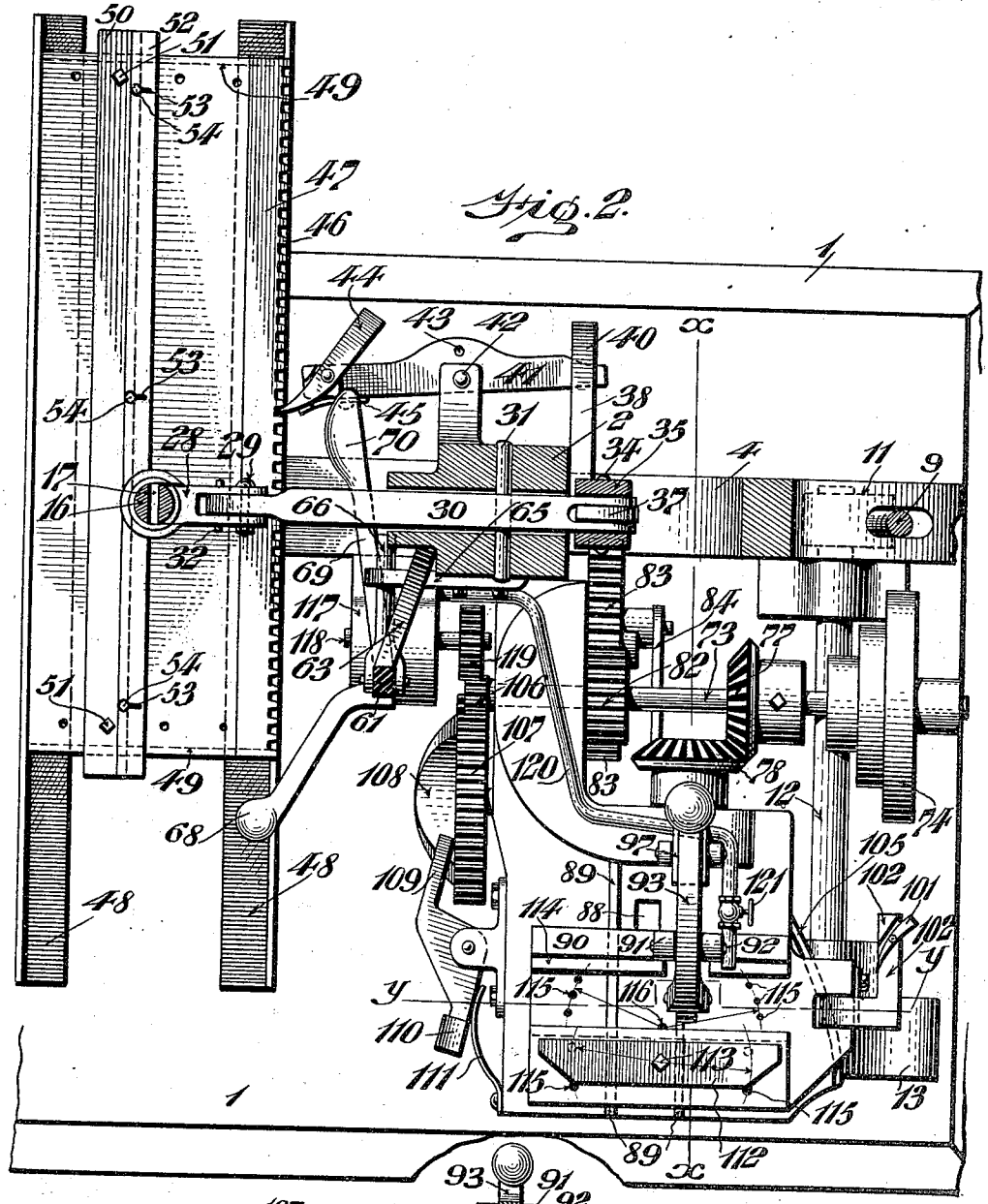
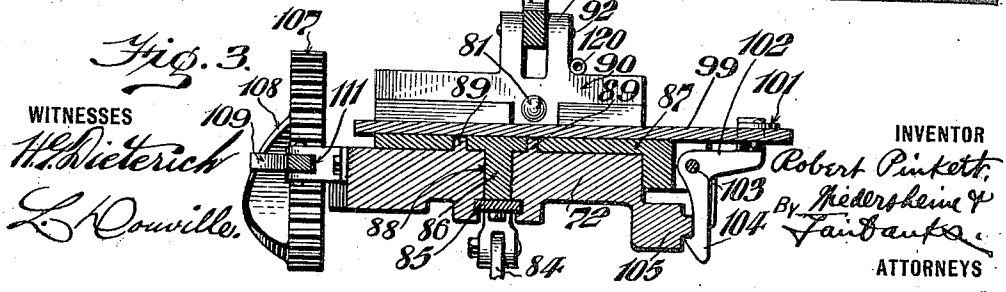


Fig. 3.



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H. G. Dieterich

L. Douville.

INVENTOR

Robert Pinkett.

By Riederscheim & Fairbanks.

ATTORNEYS

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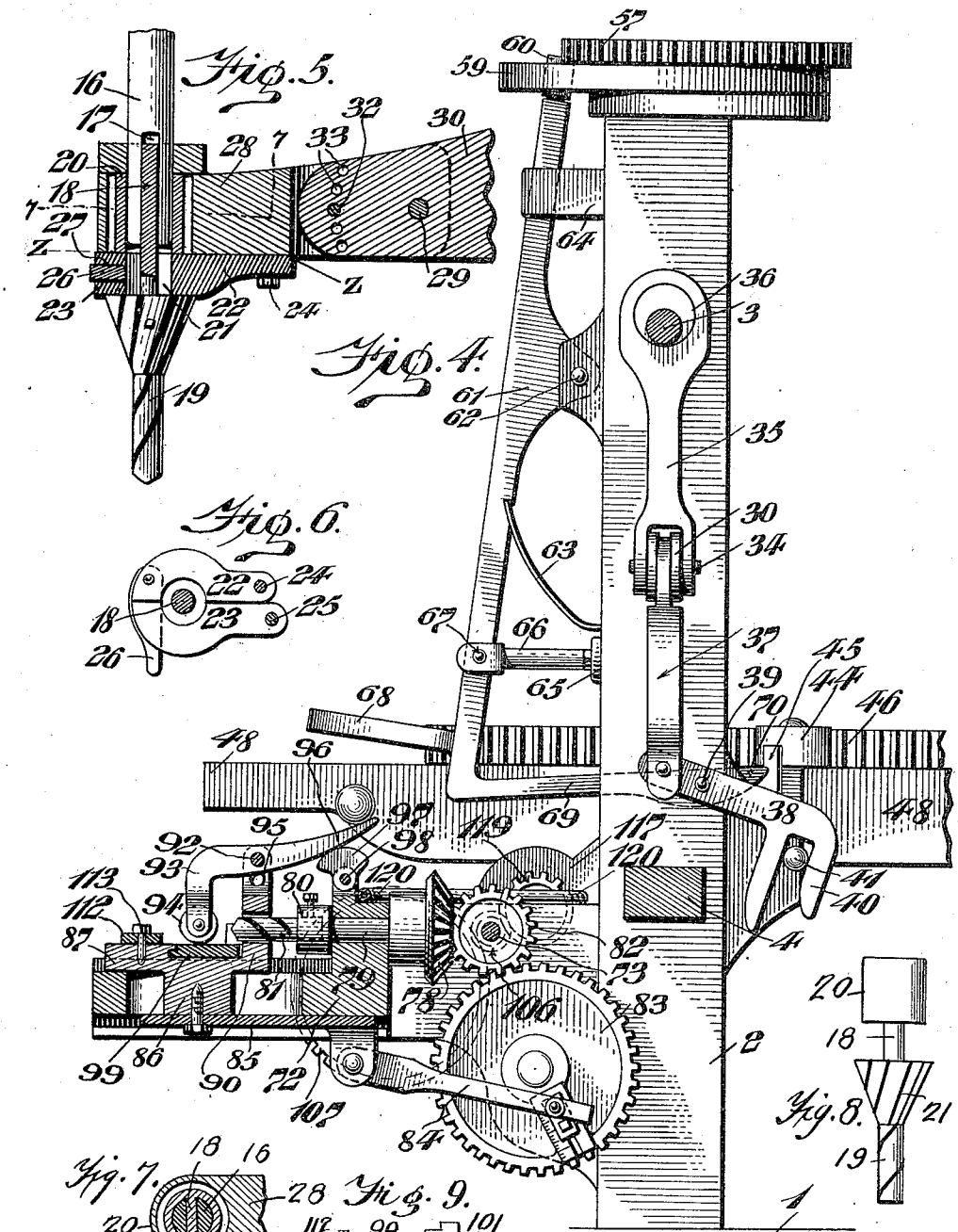
3 SHEETS—SHEET 3.



WITNESSES

H. L. Dieterich

L. Courville.

INVENTOR

Robert Pinkett.

BY Niederheim Fairbanks.

ATTORNEYS

UNITED STATES PATENT OFFICE.

ROBERT PINKETT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-THIRD TO JOHN PENZ, OF PHILADELPHIA, PENNSYLVANIA.

AUTOMATIC DRILL.

1,041,343. Specification of Letters Patent. Patented Oct. 15, 1912.

Application filed December 6, 1910. Serial No. 595,929.

To all whom it may concern:

Be it known that I, ROBERT PINKETT, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Automatic Drill, of which the following is a specification.

My present invention consists of an automatic drill which is especially designed for wood working.

It further consists of novel means for reciprocating the table or work support and novel means for causing the automatic reciprocation of the working tool.

It further consists of novel means of clamping the work on the work support and novel means for alining the work with respect to the working tool.

It further consists of novel means for clamping the work in its adjusted position with respect to the table.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

For the purpose of illustrating my invention I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a perspective view of a combined drilling apparatus embodying my invention. Fig. 2 represents a plan view thereof partly in section. Fig. 3 represents a section on line *y—y* Fig. 2. Fig. 4 represents a section on line *x—x* Fig. 2. Fig. 5 represents a sectional elevation of a modified form of my invention. Fig. 6 represents a sectional plan view on line *z—z* Fig. 5. Fig. 7 represents a sectional plan view of a portion of Fig. 5. Fig. 8 represents a side elevation of the drill socket and its adjuncts in detached position. Figs. 9 and 10 represent respectively side elevations of a portion of Fig. 1 showing the parts in different relative positions. Fig. 11 represents a sectional elevation of the secondary boring mechanism showing the parts in different relation from that seen in Fig. 3.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates the base of the machine which carries a standard 2 of any desired construction, said standard having mounted thereon a driving shaft 3, which latter is also mounted in a supporting arm, preferably carried by the standard 2. 5 designates a driving pulley with which coöperates a driving belt 6, which latter is actuated by means of any desired driving mechanism. The main shaft 3 has also mounted thereon a clutch mechanism which, in the present instance, comprises a clutch member 7 loosely mounted on the shaft and clutch member 8 non-rotatably mounted on the shaft but having longitudinal movement thereon, said member 8 having in operative relation with respect thereto a clutch arm 9 which, in the present instance, passes through the supporting bracket 4 and is pivoted therein, as indicated at 10. The lower end of the arm 9 is fulcrumed in a forked lever 11, the lower end of which is mounted on a shaft 12 rotatably carried by the base 1 and provided with a pedal or rocker arm 13, whereby the clutch member 8 may be thrown into or out of operative relation with respect to the clutch member 7. The main shaft 3 has mounted thereon a gear 14 which meshes with a gear 15 carried by a spindle 16 rotatably mounted in the standard 2 but prevented from longitudinal movement therewith, as is evident by inspection of Fig. 1. The lower end of the spindle 16 is bifurcated, as indicated at 17, thereby adapting the same to receive the shank 18 of the working tool 19, which latter is provided with a sleeve 20 normally surrounding the lower end of the spindle 16.

21 designates an annular groove on the working tool or its support with which is adapted to interlock the clamping members 22 and 23, the member 22 being suitably pivoted at 24 and the member 23 being pivoted in a similar manner at 25.

26 designates a locking lever one end of which is pivoted to the member 22, as best seen in Fig. 6, while the other end thereof is adapted to be seated in a slot 27 of the member 23.

The clutch members 22 and 23 are piv-

otally carried by the lever 28 which is pivoted at 29 to a lever 30 fulcrumed at 31 in the standard 2. The arms 28 and 30 are maintained in their adjusted position with respect to each other by means of a pin 32 adapted to engage registering apertures 33 in the two members 28 and 30, as will be clearly understood by reference to Fig. 5.

Referring now more especially to Figs. 1 and 4 it will be seen that the outer end of the member 30 is fulcrumed at 34 to the connection 35 which is eccentrically mounted at 36 on the main shaft 3.

37 designates a lever, one end of which is pivotally connected at 34 to the connection 35 and also the lever 30, while the other end thereof is pivotally connected with a lever 38 fulcrumed at 39 on the standard 2. The lever 38 is provided with a fork 40 in which is seated the lever 41 pivoted at 42 to the standard 2, it being noted that the lever 41 is provided with a plurality of apertures 43 whereby the relative position of action of said lever may be varied as desired, it being understood that any desired number of such apertures may be employed.

44 designates a pawl carried by the lever 41 and with which coacts a spring 45 also carried by lever 41 whereby the pawl is normally maintained in engagement with the rack 46 carried by the work support 47 which latter is mounted on guides 48 carried by the standard 2. The ends of the work support are grooved, as indicated at 49, thereby adapting the same to receive the guide 50 which is provided with projections engaging said grooves, said guide being maintained in its adjusted position by means of fastening devices 51.

52 designates a work clamp which is carried by the work guide 50 and slotted, as indicated at 53.

54 designates fastening devices passing through the slots 53 and engaging the work guide 50 whereby such clamp and the work may be secured in its adjusted position. When the work table or support 47 reaches the limit of its forward travel, I provide means for automatically returning the same to its initial position and such mechanism I will now describe.

The spindle 16 carries a gear 55 which meshes with an idler 56 which latter meshes with a gear 57 mounted on the shaft 58 journaled in the standard 2.

59 designates a cam longitudinally carried by the shaft 58 and adapted to coact with a roller 60 mounted on a lever 61 suitably fulcrumed at 62 in the frame-work of the machine, said roller 60 being maintained in operative relation with respect to the cam 59 by means of a spring 63. In order that the lever 61 may be properly guided in its movement, I provide a forked guide 64 adapted to guide one end of the lever 61 while on the opposite side of the fulcrum 62 I provide an apertured boss 65 through which passes the rod 66 which is pivoted at 67 to the lever 61. The lower end of the lever 61 is outwardly deflected to form a hook 68 which is adapted to coact with the end of the table when it reaches its outward limit of travel to cause the same to be returned to its initial position and in order that the pawl 44 may be disengaged during such period from the rack 46, I secure to the lever 61 an arm 69 provided with a cam 70 which on its rearward movement, as seen in Fig. 1, will engage with the pawl 44 to move the same out of engagement with the rack 46.

In order that the relative position of action of the lever 30 may be adjusted as desired, I provide a plurality of apertures 71, as seen in Fig. 1, so that the pivot 31 may pass through any one of said apertures in order to vary the depth of stroke of the working tool, it being understood of course that any desired number of such apertures may be employed to vary the depth of stroke of the working tool. The standard 2 also carries a support 72 in which is mounted a shaft 73.

74 designates a pulley mounted on the shaft 73 and provided with a belt 75 which is preferably driven by a pulley 76 on the main shaft 3.

77 designates a gear mounted on the shaft 73 and meshing with a gear 78 mounted on the shaft 79 to which latter the drill socket 80 is secured, the latter being adapted to receive the working tool such as for example the drill 81.

82 designates a gear mounted on the shaft 73 and meshing with a gear 83 suitably mounted in the frame-work of the machine and to which is eccentrically secured a rod 84, the latter being pivotally connected with a slide 85 which is connected by means of a block 86 with the work table 87, it being noted that said block 86 travels in a slot 88 in the support 72. The table 87 travels on the guides 89 and said table 87 is provided with an upward extension 90 which is suitably apertured in order to permit the working tool 81 to pass therethrough. The extension 90 is provided with a fork 91 in which is pivoted at 92 a presser arm 93 and one end of said presser arm 93 is provided with a roller 94 adapted to engage the work.

The forked arm 91 is provided with a plurality of apertures 95 in order that the presser arm 93 may be adjusted as desired. The outer end of the arm 93 is provided at its upper face with an operative cam surface 96 which coacts with a cam 97 pivoted at 98 to the frame work of the machine.

99 designates a sliding table whch travels in suitable guides on the table 87 and is provided on one side with a rack 100 with which is adapted to engage a spring pressed pawl

101, the latter being mounted on an arm 102 suitably fulcrumed in the machine at 103 and provided at its lower end with a hook 104 which engages the underside of a cam 105, whereby as the table 87 is reciprocated the sliding table 99 will be moved toward the left until it reaches the extreme end of its outer travel at which time means are thrown into operation for automatically returning the table to its initial position and such mechanism will now be described.

The shaft 3 has mounted thereon a pinion 106 which meshes with a gear 107 suitably mounted in the frame-work of the machine and provided with a cam 108 with which coacts one end of a lever 109 suitably fulcrumed in the frame-work 72 and provided with a lug or striker 110 which, when the table 99 reaches the extreme limit of its outward travel, coacts with said table to return it to its initial position, it being noted that the lever 109 is maintained in operative relation with respect to the cam 108 by means of a spring 111.

112 designates a work guide or clamp which is pivoted at 113, whereby the work may be clamped between said member 112 and the shoulder 114, as seen in Fig. 2.

115 designates apertures adapted to receive suitable pins in order to maintain the member 112 is its adjusted clamping position. Any desired number of these apertures may be employed and an additional aperture 116 may be provided in order to receive the pivot 113 when it is desired to lock the member 112 in closer proximity with respect to the shoulder 114.

It is desirable in devices of this character to employ means for removing the chips formed by the working tool and in order to accomplish this, in the present instance, I provide a blower 117 the shaft 118 of which has connected therewith a gear 119 which meshes with the pinion 106. The blower is provided with a conduit 120 provided with a suitable controlling valve 121, said conduit terminating in proximity to the end of the drill or other working tool 81, as will be apparent by reference to Fig. 2.

If desired the sliding table 99 may be dispensed with and a stationary table employed in lieu thereof.

The operation of my novel controlling apparatus will now be readily apparent and is as follows:—Upon the proper actuation of the pedal or rock arm 13 the clutch mechanism comprising members 7 and 8 will be operated thereby causing the rotation of the shaft 73. The main shaft 3, which is driven by driving belt 6, will cause rotation of the spindle 16 and as the main shaft 3 rotates the eccentric thereon will cause the arm 35 to be reciprocated thereby rocking the lever 30 and causing the working tool 19 to be moved downwardly into engagement with the work, it being apparent that depending upon the manner in which the lever 30 is pivoted the length of stroke may be increased or diminished in accordance with requirements met with in practice. As soon as the outer end of the lever 30 is moved upwardly, thereby raising the working tool 19 from the work, it will be apparent that the arm 37 will rock the lever 38 on its fulcrum 39 thereby causing the lever 41 to be rocked on its fulcrum and the pawl 44 carried by said lever will engage the next tooth in the rack 46 and cause the table 47 to be advanced one step.

As soon as the table 47 reaches the extreme end of its travel the cam 59 will reach such a position that the lever 61 will be rocked on its fulcrum thereby causing the cam 70 to move the pawl 44 out of engagement with the rack 46 and simultaneously therewith the hook 68 will engage the end of the table 47 and cause the latter to be returned to its normal or initial position.

Assuming that the clutch members 7 and 8 have been thrown into operation, the shaft 73 will be rotated thereby causing the rotation of the working tool 81 and the reciprocation of the table 87 and as the table 87 travels in its to and fro movement the arm 102 will be rocked on its fulcrum thereby causing the spring actuated pawl 101 to engage the rack 100 on the table 99 thus causing a step by step feeding of said table.

As the table 87 is reciprocated the engagement of the arm 102 with the stationary cam 105 will cause the pawl 101 to intermittently feed the table 99, it being understood that such feed of the table 99 takes place when the working tool 81 is out of engagement with the work. When the cam 108 passes out of engagement with the lever 109 the striker 110 impacts against the end of the table 99 and since the pawl 101 at this time is out of engagement with the rack the blow of the striker 110 will cause the table 99 to be returned to its initial position.

As soon as the table 99 reaches the limit of its outward travel the cam 108 will have assumed such a position that the lever 109 will be rocked on its fulcrum thereby causing the striker 110 to engage said table 99 and return the same to its normal or initial position.

It will thus be seen from Fig. 10 that when the table is moved outwardly toward its extreme outward position that the arm 104 riding on the cam 105 has caused the pawl 101 to be rocked upwardly so that it is out of the path of the ratchet on the feed table 99. It will also be clear from the sectional view seen in Fig. 11 that at such time as the arm 109 rides up on the cam 108 the striker 110 will engage the table 99 and cause the same to be returned to its primary or initial position. As the table and its adjuncts are fed forwardly toward the boring

tool, the pawl 101 is simply brought downwardly into operative position as seen in Fig. 1. When the same is moved outwardly and reaches a point about half way of its rearward movement, as seen in Fig. 9, then the pawl 101 is forced into engagement with the ratchet of the table 91 causing the same to be advanced one tooth, the pawl 101 then being moved upwardly into the position seen in Fig. 10 at which time it is disengaged from the ratchet of the table.

Special attention is directed to the novel manner of feeding the working tool 19 and also to the novel manner of controlling the reciprocation of the table 47. Special attention is also directed to the novel manner of feeding the table 87 and controlling movement of the table 99.

It will now be apparent that I have devised a novel and useful construction of an automatic drill which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described a preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a drilling apparatus, a spindle rotatably mounted and prevented from longitudinal movement, said spindle having a slotted end, a drill having a socket slidably engaging said slotted end, which latter extends into said socket, a pivoted lever, means for interlocking said lever and socket, driving means for said spindle, and cam actuating means controlled by the driving means for rocking said lever.

2. In a drilling apparatus, a spindle rotatably mounted but prevented from longitudinal movement and having a slotted end, a drill having a socket surrounding a portion of said spindle and having a shank adapted to engage said slotted end, a pivoted lever, means for interlocking said lever and said socket, and driving means operatively connected with said spindle and said lever.

3. In a drilling apparatus, a standard, a spindle mounted therein but prevented from longitudinal movement and having a slotted end, a drill having a socket movably carried by said spindle and interlocking with said slotted end so as to rotate in unison therewith, said slotted end extending into said socket, a lever pivotally mounted in said standard, means for interlocking said socket and lever, means for varying the pivotal point of said lever, and driving means for said spindle and for actuating said lever.

4. In a drilling apparatus, a standard, a spindle rotatably mounted therein but prevented from longitudinal movement and having a slotted end, a drill having a socket adapted to interlock with said slotted end so as to rotate in unison therewith, a lever pivoted in said standard, a second lever pivoted in said first lever, means for interlocking said second lever with respect to said socket, means for varying the coöperation of said second lever with said first lever, means for actuating said spindle, and devices controlled by said actuating means for rocking said first lever, whereby relative longitudinal movement of said drill socket with respect to said spindle is produced.

5. In a drilling apparatus, a standard, a spindle rotatably mounted therein but prevented from longitudinal movement, driving means for said spindle, a drill having relative longitudinal movement with respect to said spindle, a gear driven by said spindle, a cam actuated by said gear, a work support, means for intermittently feeding said work support, and means controlled by said cam for simultaneously rendering said feeding means inoperative and returning said work support to its normal position at a predetermined time.

6. In a drilling apparatus, a spindle having a slotted end, means for rotating said spindle, a drill having a socket surrounding said slotted end and having a shank in engagement with the walls of the slot, and devices connected with said means for causing the relative longitudinal movement of said drill and said spindle.

7. In a drilling apparatus, a spindle having a slotted end, a working tool having a shank in engagement with the walls of said slot and having a sleeve normally surrounding the lower end of said spindle, means for rotating said spindle, a lever for causing the relative movement of said drill and spindle during the rotation of the latter and actuating means for said lever.

8. In a drilling apparatus, a spindle having a slotted end, a working tool having a shank engaging the walls of said slot and having a sleeve surrounding said slotted end, a pivoted lever in which said sleeve is mounted, clamping means carried by said lever for preventing the disengagement of said sleeve and lever, driving means for said spindle, and means controlled by said driving means for actuating said lever.

9. In a drilling apparatus, a spindle having a slot in an end thereof, a working tool having a shank interlocking with said slot but adapted for relative movement with respect thereto, driving means for said spindle, a pivoted member controlling the feed

of said working tool and eccentrically connected therewith, a pawl operatively connected with said pivoted member, a work support having a rack with which said pawl coacts, and cam actuated means for rendering said pawl inoperative and causing the return of said work support to its initial position when the latter reaches the end of its forward travel.

ROBERT PINKETT.

Witnesses:
H. S. FAIRBANKS,
JOHN PENZ.